

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
Fixed and Mobile Services in the Mobile Satellite) ET Docket No. 10-142
Service Bands at 1525-1559 MHz and 1626.5-1660.5)
MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and)
2000-2020 MHz and 2180-2200 MHz)

COMMENTS OF TERRESTAR NETWORKS INC.

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SUMMARY

In this filing, TerreStar comments on the Commission's Notice of Proposed Rulemaking and Notice of Inquiry in ET Docket No. 10-142. TerreStar makes the following points:

NPRM

- **Primary 2 GHZ Fixed and Mobile allocation.** TerreStar supports adding primary Fixed and Mobile allocations to the 2000-2020 MHz and 2180-2200 MHz bands, which would
 - harmonize the U.S. allocation for the bands with the international allocation, thereby creating a more attractive investment environment; and
 - lay the groundwork for future flexibility; providing additional flexibility is perhaps the single most important measure the Commission can take to facilitate the provision of broadband services in MSS bands.
- **Spectrum leasing arrangements.** TerreStar supports applying the Commission's general secondary market spectrum leasing policies to MSS spectrum leasing arrangements involving the use of MSS spectrum for the provision of terrestrial services.
 - Providing regulatory certainty will facilitate arrangements to use MSS spectrum to provide broadband wireless services.
 - No special competitive analysis is required; the amounts of MSS spectrum that are available for leasing are too small to raise competitive concerns.
 - Existing MSS leasing arrangements should be "grandfathered."
- **Gating criteria.** The ground spare requirement for ATC licensees should be eliminated.
 - Now that MSS satellites have been constructed and launched, some of the Commission's assumptions underlying adoption of the rule no longer pertain.

- As applied to an operational company, the rule may actually inhibit investment and innovation.
- No satellite licensees other than MSS ATC licensees are subject to a ground spare requirement.
- **Reassigning MSS spectrum.** Rather than having a *per se* rule against using spectrum associated with a cancelled license to provide MSS services, the Commission should evaluate each case on its individual merits. In some cases, reassigning spectrum to a remaining MSS licensee may be the quickest way to bring wireless broadband services to the public.

NOI

- **Incentive auctions.** Incentive auctions are an interesting concept that warrants further consideration. TerreStar stands ready to offer additional input in the event that more detailed proposals become a reality.
- **Operating under Fixed and Mobile allocations.** The public interest benefits of permitting 2 GHz MSS licensees to operate under primary Fixed and Mobile allocations are so substantial that the Commission should not condition them on returning 2 GHz spectrum. If anything, imposing that condition would be counterproductive.
- **Coexistence between terrestrial and satellite usage.** MSS interests have funded a multi-radio strategy to optimize integration of MSS with diverse terrestrial 3G and emerging 4G network standards. TerreStar has funded development of integrated multi-band RF transceivers capable of operation on satellite and terrestrial mobile wireless networks.
- **2 GHz band in Canada.** TerreStar, as with all the other MSS licensees, is involved in the provision of an inherently international service. In TerreStar's case, this is carried out in coordination with its Canadian partners, and, as such, the policies and rules adopted by Industry Canada in relation to MSS and ATC have been of considerable relevance to TerreStar.

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TerreStar Networks Inc. ("TerreStar") hereby comments on the Notice of Proposed Rulemaking and Notice of Inquiry ("NPRM and NOI") released by the Commission in the above-captioned proceeding.¹

I. INTRODUCTION

A. Interest of TerreStar

TerreStar's wholly-owned subsidiary, TerreStar License Inc., holds a letter of intent ("LOI") authorization, originally granted in 2001, to provide MSS in the United States using spectrum in the 2 GHz band via TerreStar-1, a geostationary orbit satellite.² The LOI authorization permits the use of 10 MHz of this 2 GHz

¹ FCC 10-126 (rel. Jul. 15, 2010).

² See Order, DA 07-2028 (Int'l Bur., May 10, 2007); *TMI Communications and Company, Limited Partnership*, Order, 16 FCC Rcd 13808 (2001); *TMI Communications and Company, Limited Partnership, and TerreStar Networks, Inc. Application for Review and Request for Stay*, Memorandum Opinion and Order, 19 FCC Rcd 12603 (2004).

MSS spectrum in each direction.³ TerreStar Networks (Canada) Inc., which is indirectly owned by TerreStar and Trio 2 General Partnership, has been authorized by Industry Canada to operate TerreStar-1 in Canada.

TerreStar-1 was launched on July 1, 2009, and on July 19, 2009, TerreStar completed an end-to-end phone call over the satellite, between two of TerreStar's quad-band GSM and tri-band WCDMA/HSPA smartphones with integrated satellite-terrestrial voice and data capabilities. TerreStar-1 is fully operational, and TerreStar has completed final testing of its Ground Based Beam Forming and other subsystems. TerreStar-1 is launching service to provide voice and data services over TerreStar's all IP next-generation mobile broadband network through a combination of the power of TerreStar-1, an all-IP core network, and the latest in smartphone technology.

TerreStar has entered into a distribution agreement with AT&T to bring to market the first fully integrated satellite cellular smartphone. The smartphone combines 3G terrestrial wireless capability with satellite voice and data in a standard smartphone size and form factor. Using one phone number and one device, users will be able to access voice and data services in the United States, Puerto Rico, the U.S. Virgin Islands and offshore coastal waters over either the AT&T cellular network or the TerreStar satellite network and globally with AT&T roaming partners.

³ See *Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands*, Order, 20 FCC Rcd 19696 (2005).

B. The Commission's Proposals

In the NPRM and NOI, the Commission “seek[s] to remove regulatory barriers to terrestrial use, and to promote additional investments.”⁴ In the NPRM, the Commission makes proposals that are intended to set the stage “for more flexible licensing of terrestrial services within the [2 GHz] band” and to “create greater predictability and regulatory parity with bands licensed for terrestrial mobile broadband service.”⁵ In the NOI, the Commission seeks comment on “further steps” it can take “to increase the value, utilization, innovation, and investment in MSS spectrum generally.”⁶

TerreStar supports these goals. MSS services have unique characteristics that are complementary to wireline and wireless services.⁷ TerreStar’s native IP-based services integrate very effectively with next generation VOIP and IP Multimedia Subsystem (IMS)-based system. Because of these unique elements, MSS licensees can play a key role in making broadband services available to all Americans. Providing greater flexibility and regulatory certainty for MSS licensees will optimize the conditions for MSS’s contributions to universal broadband service. Innovation thrives and capital flows when service providers and investors can rely on a flexible but certain regulatory environment.

⁴ NPRM and NOI, ¶ 1.

⁵ NPRM and NOI, ¶ 2.

⁶ NPRM and NOI, ¶ 3.

⁷ For example, MSS satellites have ubiquitous coverage, making them ideally suited to providing broadband coverage to rural markets that lack access to terrestrial facilities. In addition, MSS satellites can be combined with ancillary terrestrial component (“ATC”) facilities, making it possible to combine the ubiquitous coverage capabilities of MSS satellites with the enhanced throughput that is available using terrestrial base stations.

II. COMMENTS ON NPRM

A. The Commission Should Add Primary Fixed and Mobile Allocations to 2 GHz to Make Them Co-Primary with MSS.

In the NPRM, the Commission tentatively concludes that it should make changes to the allocations for the 2 GHz MSS band. In particular, it proposes “to add primary Fixed and Mobile allocations to the 2000-2020 MHz and 2180-2200 MHz bands.”⁸

As the Commission has stated, adding a primary allocation would harmonize the U.S. allocation for the bands with the international allocation.⁹ As a satellite services provider, international by nature and by fact, TerreStar has found that regulatory harmonization is most often a critical issue for successful business development. The intensive cost of technology and semi-conductors for advanced communications systems such as TerreStar’s requires an investment at a global scale in today’s market. Regulatory harmonization creates an attractive investment environment. Having the same allocation plan as other countries provides U.S. companies and companies serving the U.S. greater opportunities to support the public and national interest.

The Commission also states that “making this allocation [will] ... lay the groundwork for future flexibility in use of this spectrum”¹⁰ TerreStar favors more flexible rules for use by licensees of 2 GHz MSS spectrum. Providing additional

⁸ NPRM, ¶ 10.

⁹ See NPRM, ¶ 10.

¹⁰ NPRM, ¶ 10.

flexibility is perhaps the single most important measure the Commission can take to facilitate the provision of broadband services in MSS bands.

B. The Commission Should Apply Its “Secondary Markets” Policies and Procedures When an MSS Operator Leases Its Spectrum to a Third Party for the Provision of Terrestrial Services.

TerreStar supports the Commission’s proposal “to subject spectrum leasing arrangements between an MSS operator in the 2 GHz, Big LEO, and L-bands and a third party entity involving the use of MSS spectrum for the provision of terrestrial services to the Commission’s general secondary market spectrum leasing policies and rules that currently apply to wireless terrestrial services.”¹¹ The secondary markets procedures have a proven track record and have worked well. By establishing regulatory certainty, moreover, extending the procedures to MSS will facilitate arrangements to use MSS spectrum to provide broadband wireless services.

The Commission has inquired whether, because “the ATC rules require use of an integrated MSS/ATC network,” MSS licensees and lessees of MSS/ATC spectrum should “only be permitted to enter into spectrum manager leasing arrangements” or “should ... also have the option of entering into *de facto* transfer leasing arrangements, as permitted in the Wireless Radio Services.”¹² TerreStar sees no reason to make the rules more restrictive for MSS than for

¹¹ NPRM, ¶ 17.

¹² NPRM, ¶ 24.

Wireless Radio Services; *de facto* leases can be structured to ensure compliance with any relevant Commission rules or policies.¹³

The Commission also has asked whether its competitive evaluation of MSS secondary market transactions “should ... differ in any respect from its current considerations of potential competitive harms under the existing spectrum leasing policies applicable to terrestrial mobile services.” The only difference for this purpose between Wireless Radio Services spectrum leasing and MSS spectrum leasing is that it is virtually impossible for MSS spectrum leasing to have a material competitive impact. The amounts of MSS spectrum that are available for leasing are too small. For example, even if all the MSS licensees were to lease 100% of their spectrum, the lease would cover only 90 MHz.¹⁴ By way of contrast, 547 megahertz of terrestrial spectrum is currently licensed in the bands below 3.7 GHz that can be used for mobile broadband.¹⁵

Finally, the Commission seeks comment on “how the adoption of industry-wide MSS/ATC spectrum leasing rules should affect existing MSS leasing arrangements.”¹⁶ TerreStar sees no reason to apply new MSS leasing rules retroactively. Given the Commission’s stated intent in bringing spectrum into use as quickly and as efficiently as possible, the Commission should not place an

¹³ Like Wireless Radio Services licensees, MSS licensees should be permitted to partition and disaggregate their service areas, which by virtue of satellite authorizations are nationwide.

¹⁴ See NPRM, ¶ 1 (“90 megahertz of spectrum allocated to the Mobile Satellite Service (MSS) – in the 2 GHz band, Big LEO band, and L-band – are potentially available for terrestrial mobile broadband use”).

¹⁵ *Connecting America: The National Broadband Plan* (“National Broadband Plan”), at 84, <http://download.broadband.gov/plan/national-broadband-plan.pdf>.

¹⁶ NPRM, ¶ 24

additional burden of regulatory uncertainty. MSS leasing arrangements that exist at the time rules are adopted will have been entered into in good faith, in reliance on the rules and policies in effect on the date of execution. Subjecting these leasing arrangements to new rules after the fact would be inherently unfair.

C. Updating Gating Criteria

The Commission's logic in setting out gating criteria was to ensure, where possible, that MSS providers continued to provide 'substantial satellite service' if given authority to also provide ATC. The Commission carefully weighed many potential scenarios, and sought to ensure its policy goals while also minimizing unnecessary burdens that might limit licensees' abilities to successfully roll out a business. The Commission then concluded with a policy reflecting the best balance of interests that it could assess at the time. Now, years later, all of the remaining licensees have launched satellites and some are moving into their second generation of satellites.

As the Commission is considering how to increase flexibility for licensees to attract sufficient investment and to roll out innovative services to the public, it is timely to consider whether the current gating criteria still reflect the best balance of licensees' interests.¹⁷ TerreStar believes that renewed consideration of the issues will show that certain elements of the gating criteria have become more of a limitation than an incentive to provide substantial satellite service.

¹⁷ National Broadband Plan at 88 ("So far, the ATC gating criteria have made it difficult for MSS providers to deploy ancillary terrestrial networks, as well as to establish partnerships with wireless providers or other well-capitalized potential entrants.").

For example, Section 25.149(b)(2)(ii) of the Commission's rules requires that GSO MSS ATC licensees "maintain a spare satellite on the ground."¹⁸ At the time the Commission adopted this rule, it discussed the "continuous coverage" policy that underlies the rule. Although the Commission acknowledged that "investment in ATC at the expense of MSS coverage requirements ... [is] unlikely," it decided that requiring continuous coverage was warranted because it "may provide some benefit in helping to ensure continued investment and innovation in an MSS licensee's space-station assets" and because it believed there was a "lack of any significant cost to MSS licensees."¹⁹

With build and launch processes complete, it is now clear that some of these assumptions no longer hold as much merit. Once a satellite has been launched and is successfully operational, it has retired most of the risk relating to operations. Although there are some incidents, the vast majority of satellites provide productive service for many years. As a result, the most likely impact of the spare satellite obligation for a company like TerreStar is that a very significant amount of cost is sunk in building a satellite, which is then tied up for years (with ongoing costs for storage), limiting funds that might otherwise be available for service-related investment and innovation. And then, if the spare

¹⁸ 47 C.F.R. § 25.149(b)(2)(ii). A similar requirement for NGSO MSS ATC systems appears in Section 25.149(b)(2)(i).

¹⁹ *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962 (2003), ¶ 81, modified by Order on Reconsideration, 18 FCC Rcd 13590 (2003), reconsidered in part in Mem. Opinion and Order and Second Order on Reconsideration, 20 FCC Rcd 4616 (2005).

satellite is actually needed – most likely towards the end of the first satellite's life when systems are more likely to fail – TerreStar would be forced to launch a satellite that could be a decade behind in technology. Thus, as applied to an operational company, this rule may actually act to inhibit investment and innovation.²⁰

In considering the regulatory context, no satellite licensees other than MSS ATC licensees are subject to a ground spare requirement. Given the burden already borne by MSS licensees who have followed the Commission's rules and pursued spare satellites, some flexibility should be introduced in order to prevent the unanticipated burdens from stagnating the ability to evolve the business. What licensees need at this juncture, TerreStar believes, is the flexibility to determine how best to assure continuity of satellite service, whether through commercial arrangements for backup capacity in case of emergency or spare satellites or through some other appropriate mechanism.

D. The Commission Should Preserve a Range of Options in the Event a 2 GHz MSS License is Returned or Cancelled.

The Commission states in the NPRM that, in keeping with the proposed flexible allocation, if a 2 GHz MSS license were cancelled it would not reassign the licensee's spectrum to an existing MSS licensee or a new MSS entrant.²¹

²⁰ TerreStar has complied with the ground spare requirement at great cost in terms of money and other resources; TerreStar-2 is over 90% completed. If the ground spare requirement were eliminated or modified, TerreStar would be in a position to repurpose the satellite for productive use.

²¹ See NPRM, ¶¶ 9, 14-15.

Rather, at that point the spectrum would be made available exclusively for terrestrial use.²²

TerreStar respectfully suggests that this proposal would undermine the flexibility the Commission is attempting to achieve. Rather than having a *per se* rule against using spectrum associated with a cancelled license to provide MSS services, the Commission should evaluate each case on its individual merits. In some cases, reassigning spectrum to a remaining MSS licensee may be the quickest way to bring wireless broadband services to the public. It could be, for example, that the remaining MSS licensee already has constructed or otherwise has access to a terrestrial network, and has developed handsets, all of which are capable of operating across the MSS spectrum at issue. While making that spectrum available to another party would require a nationwide buildout and other expensive chipset and technology development, the MSS licensee would be capable of bringing the spectrum to the mobile broadband market immediately. In other cases, there may be a compelling reason to continue MSS service to accommodate customers depending on MSS spectrum for national security or public safety purposes. These matters are best resolved in concrete factual contexts.

In any event, TerreStar notes that the proposal by its terms does not apply unless and until a 2 GHz MSS license is cancelled or returned voluntarily.

²² NPRM, ¶ 15.

III. COMMENTS ON NOI

A. Encouraging the Growth of New Mobile Broadband Services in the 2 GHz MSS Band

In the NOI, the Commission “seek[s] comment on how best to encourage the growth of new mobile broadband services in the 2 GHz Band.”²³ The Commission asks what steps it can take to “attract investment” under “the proposed co-primary Fixed and Mobile allocations.”²⁴ It suggests as possibilities conducting incentive auctions and giving 2 GHz licensees the option to return some of their spectrum and permitting them to operate the remaining spectrum under the proposed Fixed and Mobile Allocations.²⁵ TerreStar comments below on each of these measures.

1. Incentive auctions

Incentive auctions are an interesting concept that warrants further consideration. It remains to be seen whether legislation will be passed authorizing the Commission to conduct incentive auctions, and if such legislation were passed, numerous details would need to be addressed. Given these uncertainties, there can be no assurance that incentive auctions will become a reality on terms that would be attractive to interested parties or in a timeframe that would achieve the Commission’s stated goals. It would be prudent, therefore, to give serious attention to other measures. TerreStar stands ready to offer additional input in the future in the event that proposals for incentive auctions become more practical.

²³ NOI, ¶ 27.

²⁴ NOI, ¶ 27.

²⁵ See NOI, ¶¶ 28-30.

2. **Returning some spectrum and operating under Fixed and Mobile allocations**

TerreStar reiterates that the single most important step the Commission can take to facilitate investment in mobile broadband services using 2 GHz MSS spectrum is to provide additional flexibility in the use of that spectrum.

Flexibility can take many forms, and permitting 2 GHz MSS licensees to operate under primary Fixed and Mobile allocations is an important one. TerreStar supports this proposal, and is convinced that the extra flexibility afforded by operating under these primary allocations would materially enhance its ability to attract investors for mobile broadband purposes.

The public interest benefits of permitting 2 GHz MSS licensees to operate under primary Fixed and Mobile allocations are so substantial that the Commission should not condition them on returning 2 GHz spectrum. If anything, imposing that condition would be counterproductive, because it would mean that at the same time 2 GHz MSS licensees were adding to their attractiveness to investors, by gaining the flexibility associated with primary allocations, they would be making themselves less attractive to investors, by reducing their spectrum holdings.²⁶

Having to turn in 2 GHz spectrum, moreover, would undercut MSS-related public interest benefits the Commission has relied on in assigning the

²⁶ *Cf. Ex Parte* Submission of the United States Department Of Justice, *In the Matter of Economic Issues in Broadband Competition/A National Broadband Plan for Our Future*, GN Docket No. 09-51 (Jan. 4, 2010) at n. 60 (“We do not specifically address here the mechanisms used to free up spectrum previously used by, or assigned to, specific entities. ... [But] [i]n all events, it would be beneficial to permit existing users of spectrum to deploy it for new (and more valuable) uses, either by themselves or in collaboration with others (such as through secondary market leasing arrangements.”).

spectrum, including making it possible for MSS licensees to provide “crucial communications services during times of national emergencies” and to “offer rural broadband services.”²⁷ Reducing the spectrum assigned to the 2 GHz MSS licensees would negate these public interest benefits just when technology investments in satellites, launches, chips, and handsets have matured to the point where they can start delivering desired benefits.

For all of these reasons, the Commission should extend the benefits of primary Fixed and Mobile allocations to 2 GHz MSS licensees without requiring the licensees to turn in spectrum.

B. Increasing Value, Utilization, Innovation and Investment in all MSS Bands

1. Coexistence between Terrestrial and Satellite usage

The NOI asks about coexistence between terrestrial use and MSS use.²⁸ TerreStar and other MSS ecosystem participants have invested considerable resources in addressing coexistence and the interrelationship between terrestrial traffic and satellite, both in the same bands and in partner or complementary bands. More precisely, MSS interests have funded a multi-radio strategy to optimize integration of MSS with diverse terrestrial 3G and emerging 4G network standards. TerreStar has funded development of integrated multi-band RF transceivers capable of operation on satellite and terrestrial mobile wireless networks. The GENUS™ smartphone (“GENUS”), developed by TerreStar with Elektrobit Corporation (EB), is a quad band device capable of MSS in the 2 GHz

²⁷ See *Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands*, Order, IB Docket Nos. 05-222 and 05-221, FCC 05-204 (rel. Dec. 9, 2005), ¶ 26.

²⁸ NOI ¶ 32-34.

band, in addition to multi-band communication on terrestrial GSM networks, including the licensed 800, 900, 1800 and 1900 MHz cellular/PCS bands.²⁹ The GENUS incorporates GEO-Mobile Radio Third Generation (GMR-1 3G) release 3 specifications, an adaptation to the satellite environment of the 3G UMTS packet data architecture known as the EDGE air interface.

GMR-1 3G supports access to 3GPP core networks enabling delivery of satellite VoIP and packet data applications over IP, such as email, Internet access, Web browsing and FTP.³⁰ The GENUS also contains radios including Bluetooth, 802.11b/g for internet connectivity when near a broadband connection with a Wi-Fi router, USB 2.0 for data transfer from/to external devices, and support for GPS location positioning.

Beyond this work, the satellite and smartphone technology developed by MSS/ATC licensees is designed to integrate MSS into the broad 3G to 4G mobile wireless ecosystem to complement networks based on 3GPP and IMS standards with ubiquitous coverage. TerreStar has installed a 4G core with IMS to enable easy interoperability with LTE networks as they come online. TerreStar and other

²⁹ Full specifications for the TerreStar GENUS smartphone are available at: http://www.terrestar.com/inc/pdf/TerreStar_Handset.pdf. The unique feature of the GENUS relative to other offerings in the burgeoning smartphone market is that it adds a web enabled, standards based MSS option to the multiple GSM bands in which it operates. The National Broadband Plan at 18 notes that 850 different handsets were certified by OET in 2009. TerreStar believes the GENUS is the only device to feature 3GPP standards-based MSS in a standard smartphone form factor that operates across multiple GSM bands.

³⁰ GMR-1 3G operates in FDD mode with RF channel bandwidths from 31.25 kHz up to 312.5 kHz in the MSS bands (L and S GEO licensees). It provides a level of spectrum granularity that facilitates spectrum sharing and efficient exchange of VoIP and IP data services between IMS based mobile networks and devices. The GMR-1 3G standard is designed to adapt to various form factors and device types depending on the implementation and requirements of the 3G terminal.

GEO MSS providers have entered individual and joint agreements with semiconductor manufacturers to integrate software defined radio technology to enable satellite functionality in baseband with RF chips used in terrestrial CMRS devices. The chips will feature common air interface protocols and the frequency agility necessary to embed the ubiquity of MSS within mobile devices. At present, a GENUS device can be authenticated for standalone MSS use, or for communication on any authorized GSM network. In 2009, TerreStar and other MSS GEO operators entered into an agreement with Qualcomm to develop satellite/terrestrial functionality in a standard chipset. The agreement further provides for multi-band MSS capability thereby adding satellite diversity to EVDO and LTE chipsets for mobile devices. The agreements by design will develop technology for use in 3G and 4G mobile devices and base transceiver control components to integrate satellite into a variety of Terrestrial Radio Access Network equipment.³¹ TerreStar's development efforts have not been limited to mobile terminals. It funded rebanding of the RF module in Nokia Siemens Networks Flexi base transceiver station to add the S band. The S band Flexi-2000 has been certified by OET as compliant with part 25 rules, as has the GENUS smartphone.³²

³¹ See Qualcomm ex parte in FCC Dkt. 09-51 (Oct. 29, 2009) describing development for L and S band MSS licensees of a satellite-based variant of EV-DO Revision A, known as S-DO, to be included in the firmware of select Qualcomm multi-mode chips, that integrates satellite and cellular technology for use in the L and S bands. This S-DO technology will be incorporated in chips which also support terrestrial LTE, UMTS, and/or EV-DO.

³² See grants of equipment authorization, FCC identifiers: VBNFRJA-01 and VBNFRJB-01 (granted Jul. 9, 2010) to Nokia Siemens Networks. The GENUS handset was certified as compliant with Part 25 rules for the S band in addition to

As noted, L and S band GEO licensees are collaborating with chip manufacturers to develop frequency agility and 3GPP standards-based air interfaces that can be embedded in CMRS transceivers, including telematic devices,³³ to create interoperability between MSS and CMRS networks. The MSS GEO licensees seek to create a commoditized cost structure for chipsets to stimulate production in the RF equipment, mobile applications and device sectors that integrates MSS/terrestrial capability. The near and long term vision for the agreements with semiconductor and wireless infrastructure producers is to push forward at very low marginal costs the mass market adoption of integrated MSS/terrestrial technology that can be integrated into terrestrial mobile devices requiring satellite ubiquity. The chipset development ecosystem is focused on development and production of multi-mode and multi-band functions critical to TerreStar's integrated architecture plan.³⁴ All of the above technology development will be compatible with evolving 3GPP standards-based LTE (release 8 and beyond) that are the basis for 4G mobile deployments.

All networks – wireline, wireless and satellite – have been converging to integrated, packet data architectures. One of several defining characteristics of 4G wireless networks is an all-IP architecture. The evolution of satellite

the 850 MHz cellular and 1.9 GHz AWS bands on December 1, 2009. *See* FCC Identifier OBW and product code 120897.

³³ *See* National Broadband Plan at 77. MSS fits well in the ecosystem for low bandwidth machine to machine (M2M) devices used for remote sensing and control in safety, security, maintenance and convenience applications.

³⁴ This effort has been facilitated by the spectral location of the 2 GHz S band relative to European 3G bands. The S band is close enough to terrestrial UMTS bands to enable off the shelf UMTS transceiver chips or base station RF modules to be more easily rebanded.

technology in recent years led TerreStar to build an all-IP core network managed by an IMS software architecture to provision, aggregate, and customize applications across various access methods and media devices. All call processing is done in the packet-switched (PS) domain via a core IMS network which manages call session control (CSCF) and home subscriber application server (HSS) functions between application servers and end users via standardized interfaces, primarily Session Initiation Protocol (SIP). Similarly, SIP controls routing across heterogeneous networks and end points. Interconnection with the Internet and other public and private data network is accomplished through IP interconnection and peering arrangements or at Media Gateway(s) that convert Time Division Multiplexed (TDM) circuits to IP compatible connectivity and vice versa.

In TerreStar's network, a Satellite Base Station Subsystem (S-BSS) interfaces with a 3GPP mobility core 3G General Packet Radio Service (GPRS) network supporting network control functions and connections to upstream GPRS Support Nodes. The S-BSS modulates and demodulates user traffic, provides load and congestion control for satellite beams, and executes admission control for S band radio links. MSS and/or terrestrial wireless devices integrate via the resources described above or interconnect with TerreStar's Core IP Mobility Network anchored to satellite gateway facilities and Network Operations Centers (NOC) in the U.S. and Canada. The gateways and NOCs have global IP connectivity and peering via dedicated network facilities. A Universal SIM (USIM) card is necessary for mobile device authentication and SIP registration with the MSS or CMRS network over a secure attachment protocol. Ground

facilities provide dynamic traffic management and MSS/ATC spectrum resource allocation.

2. 2 GHz band in Canada

Finally, the NOI asks about what is happening in other countries.

TerreStar, as with all the other MSS licensees, is involved in the provision of an inherently international service. In TerreStar's case, this is carried out in coordination with its Canadian partners, TerreStar Networks (Canada) Inc., and, as such, the policies and rules adopted by Industry Canada in relation to MSS and ATC have been of considerable relevance to TerreStar.

Mobile satellite networks provide communications to all areas of Canada and have been of particular importance for people in rural and remote areas where terrestrial cellular service is not available. In 1994, Canada was one of the first countries to open its domestic market to foreign mobile satellites so as to foster competition and ensure choice of services to Canadians. More recently, Canada eliminated its restrictions on the ownership of Canadian satellites by non-Canadians. Although cellular mobile, Personal Communication Services (PCS), and Advanced Wireless Services (AWS) reach over 90% of the Canadian population, the actual coverage remains in the range of 20% of the Canadian land mass.³⁵ As such, mobile satellites provide the only portable communications to all Canadians and to several sectors of the economy having important industrial and government activities in sparsely populated regions of Canada.

³⁵ Canadian Radio-television and Telecommunications Commission, *Communications Monitoring Report*, July 2010, at 153.

Industry Canada has taken the position that, if the mobile satellite industry is to succeed in delivering advanced satellite services at affordable prices, the industry needs some flexibility to innovate and improve its service delivery and coverage. This would enable the industry to compete in a harmonized North American marketplace and to have the policy and regulatory certainty to plan major satellite investments for new satellite infrastructures.

In 2004 Industry Canada concluded that the offering of mobile-satellite service with an integrated ancillary terrestrial component (ATC) of mobile service would serve the public interest, in particular, if:

- It increases the efficient use of already assigned MSS spectrum;
- It has the prospect of improving the economics of new satellite infrastructure capable of providing a range of digital services to Canadians, especially those not served by purely terrestrial services;
- It recognizes the multi-national nature of the mobile-satellite service and the need to have common marketplace rules;
- It fosters competition, choice of services and more affordable prices; and
- It can be achieved through a reasonable, flexible policy and licensing regime that neither distorts the market forces of competition, nor confers unreasonable advantages to certain wireless carriers.³⁶

³⁶ Industry Canada, *Spectrum and Licensing Policy to Permit Ancillary Terrestrial Mobile Services as Part of Mobile-Satellite Service Offerings*, Radio Systems Policy-23 ("RP-23"), May 2004, at 6.

Industry Canada also concluded that providing the flexibility to develop a terrestrial mobile service as an integrated ancillary component to the mobile-satellite service offerings, with reasonable regulatory and operational oversight, will serve the Canadian public interest and foster Canada's telecommunications policy objectives. In particular, these new mobile satellite networks could provide advanced communication services at affordable prices to rural and remote areas. The implementation of ATC will require no additional radio frequency spectrum and with proper technical and operational measures, will operate in a reasonable interference-free environment, and co-exist with other MSS networks and other primary services operating in adjacent frequency bands.³⁷

In preparation for the launch of an integrated MSS service in Canada and to reduce uncertainties for MSS and ATC service providers, Industry Canada recently issued an interim ATC fee decision,³⁸ setting the fee at a reasonable rate, given the nascent nature of the industry in Canada. As well, TerreStar Solutions,

³⁷ *Ibid.*

³⁸ See Industry Canada, *Radio Authorization Fees for Mobile Satellite Services Using Radio Spectrum Above 1 GHz*, Gazette Notice No. DGRB-009-99.

the Canadian retail arm of the TerreStar family, was granted a national ATC authorization.³⁹ In order not to delay the development of the MSS/ATC service in Canada, Industry Canada plans to release shortly a Radio Standards Specification (RSS)⁴⁰ and Standard Radio System Plan (SRSP)⁴¹ for the various MSS/ATC bands.

Respectfully submitted,

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³⁹ See Industry Canada, MSS-ATC Special Authorization Issued to TerreStar Solutions Inc, <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09928.html> (rel. Jul. 19, 2010).

⁴⁰ See Industry Canada, *Satellite Mobile Earth Stations*, Radio Standards Specification 170 ("RSS-170"), Issue 1, Rev. 1, (rel. Nov. 6, 1999. Amendments to RSS-170 were considered by the Radio Advisory Board of Canada (RABC) in July 2010 and consensus changes were subsequently submitted to Industry Canada for review.

⁴¹ RP-23, *supra*, note 31. In conjunction with the proposed amendments to RSS-170 noted above, it is anticipated that Industry Canada will make consequential changes to the technical annex to RP-23.